SOUTH CAROLINA ORAL HEALTH NEEDS ASSESSMENT 2002

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INTRODUCTION

The Surgeon General provided a wake up call concerning the oral health through the release in 2000 of his report, "Oral Health in America". While his reference to the "silent epidemic" of dental disease took many individuals by surprise, it was not news to the many dedicated professionals and parents in South Carolina who have worked tirelessly to improve the health of our children. In recognition of the growing need, the SC Department of Health and Environmental Control (DHEC) partnered with the US Health Resources and Services Administration (HRSA) to provide leadership for a greatly expanded and focused dental public health program in South Carolina, starting in 2000. After this resumption of the expanded public oral health activities in South Carolina, gaps were identified in the dental health infrastructure. Similar to the national situation, there was a total lack of system of collecting oral health surveillance information. In this regard, a major concern was the lack of current data regarding disease burden rates in school-aged children. The last school-based survey of children was conducted in 1982-83. This issue was addressed in 2001-2 with the conducting of a statewide Oral Health Needs Assessment. This baseline survey served as the first step in establishing an integrated and comprehensive oral health surveillance system, funded by the Centers for Disease Control and Prevention (CDC)

A. OVERVIEW OF 1982-83 SURVEY

During the 1982-83 school year a random sample of about 6700 school children was examined. A DMFT (Decayed, Missing, and Filled Tooth) index was used to assess the status of each permanent tooth space excluding third molars (wisdom teeth). Each tooth space was the unit of measurement for the DMFT score (the sum of the disease conditions of all permanent teeth spaces in the mouth of each examined child). The D represented teeth which were decayed at the time of examination; the M represented teeth which were missing due to caries; and the F represented teeth which were previously decayed but had been filled, and had no evidence of decay remaining. A DMFT score is a cumulative measure of caries experience. Once a tooth is counted as a DMF tooth, it remains in the total score for the life of the individual.

The survey showed that 74% of children aged 5-17 had experienced caries. Non-white children had more decayed than filled teeth, while white children had more filled than decayed teeth. 54% of white children needed dental treatment while 79% of the non-white children required dental treatment.

B. ASTDD SEVEN-STEP MODEL

To standardize the 2002 needs assessment; the Seven-Step Model of the Association of State and Territorial Dental Directors (ASTDD) was used. In keeping with the first step of the model, an advisory committee was identified and several meetings were held between the committee and South Carolina Department of Health and Environmental Control (SC DHEC) Oral Health Division staff to finalize the design of the actual survey process. Three objectives were agreed upon as the final goal of the needs assessment process during these meetings.

C. OBJECTIVES OF NEEDS ASSESSMENT SURVEY.

The goal of the project was to achieve the following objectives.

1) Determine prevalence of dental caries in school-aged children in the state of South Carolina
2) Obtain baseline data for establishing ongoing surveillance of dental health in South Carolina's children
3) Provide data necessary to establish and focus prevention programs, policies, and resources.

D. SAMPLING AND DATA COLLECTION

The needs assessment was conducted in South Carolina public schools, surveying children in grades K and 3. A sample size in the vicinity of 21,000 students was selected from 143 sample schools representing all 46 counties.

Sampling Methodology:

1. Counties were ranked in order from smallest to largest based on their total enrollment of K and3 students.
2. A maximum sample size was obtained for each county by determining the proportion each county should contribute to the state total based on their enrollment and multiplying by 150 (the minimum number required to render the study adequate statistical power). This yielded a state total of 83,000 students, which was not a practical number to survey given the resources available. This represented about 25% of the total population of K and 3rd graders in the state.
3. The sample size was then reduced to 20% to get a workable number. In each case the counties whose sample size fell below 150 were increased to 150 to maintain the minimum sample size needed in each county, but to have the larger counties proportionally represented.
4. Once the sample size was obtained, schools were randomly selected in each county from a list of all schools in the state provided by the State Department of Education. This was done by running a SAS® (Statistical Analysis System) program, which assigned a random number between 0 and 1 to each school. A proportion of schools were then chosen depending on the sample size needed in each county. This was done separately for each county.

5. Once the random sample of schools was obtained, adjustments were made to ensure that the sample of schools was representative of each county in terms of race and socioeconomic status distribution. The proportion of non-white and white children and the proportion of students enrolled in the reduced and free lunch program in the sample were compared to the proportion of non-white and white children and reduced/free lunch program participants in the total population for each county. Reduced and free lunch participation was used as a proxy measure for income. Schools were added or substituted for to make sure the selected schools were representative of the overall child population in terms of race and income.

The survey took most of 2002 to administer. The process included questions on demographics and a brief dental screening. The dental screening survey instrument used was the Basic Screening Survey, an existing instrument developed and validated by the ASTDD.

E. DATA ENTRY AND ANALYSIS

Data entry was performed using Microsoft Excel and data files were sent to the SC Budget and Control Board, where the data were de-identified and information regarding race and socio-economic status (free and reduced lunch eligibility) was added. Data editing, standardization, and analysis was performed at the Oral Health Division (SC DHEC) using *EpiInfo* Statistical software from the Centers for Disease Control and Prevention (CDC).

The Oral Health Division, SC DHEC acknowledges and gives thanks to Health Promotion Specialists for sharing data on several of the schools included in our sample, and to Dr. Kathy Phipps of the ASTDD for providing invaluable technical assistance to the project.

A special thank you also goes to the many volunteer dentists and dental hygienists without whose help this project would never have been completed.

DEFINITIONS

1. ***Dental Caries:*** Occurs when the balance between the process of demineralization and the protective process of remineralization shifts towards demineralization. ***Precavitated caries:*** Early signs of dental caries appear when the process of demineralization progresses to the degree that the color and the translucency of the tooth surface are altered. ***Cavitated Caries****:* If demineralization continues, the outer surface structure collapses, leading to the formation of a cavity. In the Basic Screening Survey process teeth are only considered decayed at the point in the caries process when enough enamel has been lost from the surface to create a ½ mm discontinuity or, more simply stated a "hole."

2. ***Caries experienced:*** Determined by the presence of an untreated cavity, a filling (which presumably was once a cavity), or a permanent molar tooth that is missing because it was extracted as a result of caries.

3. ***Untreated Decay:*** Determined by the presence of an untreated cavity.

4. ***Dental Sealants:*** A resin coating that covers the chewing surface of the molar teeth making them more resistant to decay.

5. ***Statistical significance:*** A finding is described as statistically significant when it can be demonstrated that the probability of obtaining such a difference by chance is relatively low.

6. ***$p<0.05$*:** is a value of statistical significance; p represents probability-the probability of getting something more extreme than the survey result. Less than .05 means that there is less than 5 percent chance that the result was due to chance.

7. ***Statistical Power:*** Odds that you will observe a treatment effect when it occurs.

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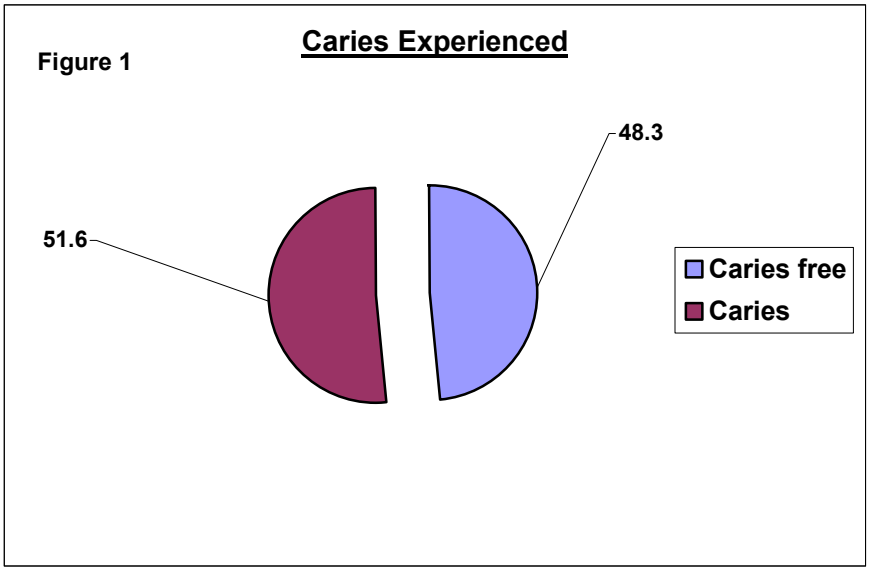
STATE WIDE ANALYSIS (*SAMPLE SIZE 21,332 CHILDREN, in GRADES K AND 3*)

KEY FINDING # 1: About half (51.6% or 11008) of the children screened had experienced decay.
Criteria: at least one permanent or primary tooth with both:

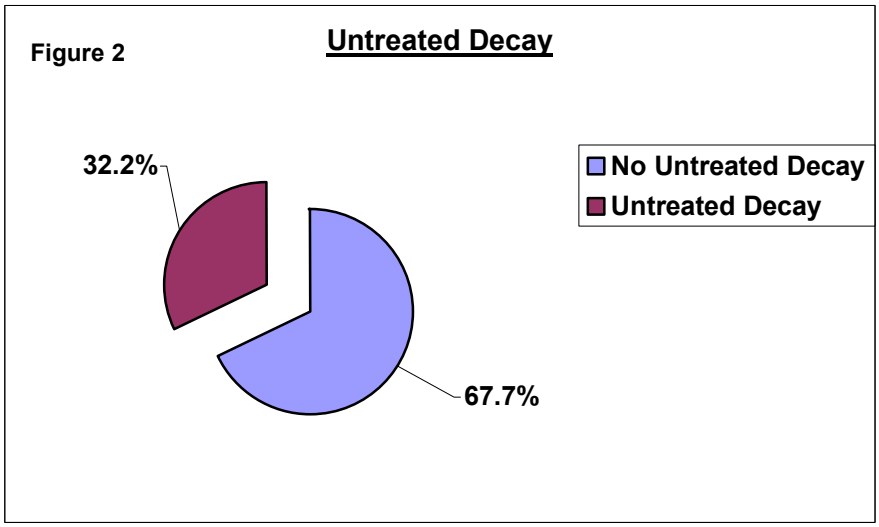
- A loss of at least ½ mm of tooth structure at the enamel surface (cavitation), and,
- Brown to dark-brown coloration of the walls of the cavity

Figure 1

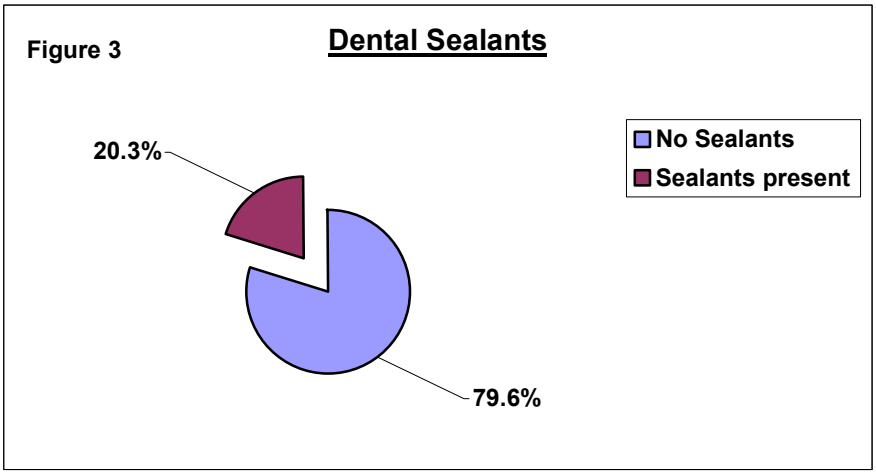


KEY FINDING # 2: 32.2% (6,874) of the children screened had untreated decay.
Criteria: At least one primary or permanent tooth with untreated decay.

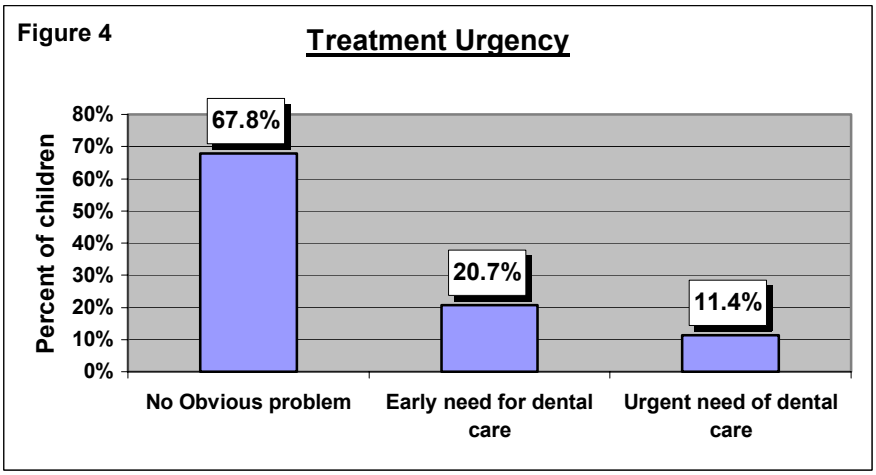
Figure 2



KEY FINDING # 3: Only 20.3% (2,144) of 3rd grade children screened had at least ***one permanent molar*** with a dental sealant. The Healthy People 2010 Objective is 50%.



KEY FINDING # 4: 20.7% (4,416) of children screened required early dental care while an additional 11.4% (2,442) required urgent dental care.



Criteria:

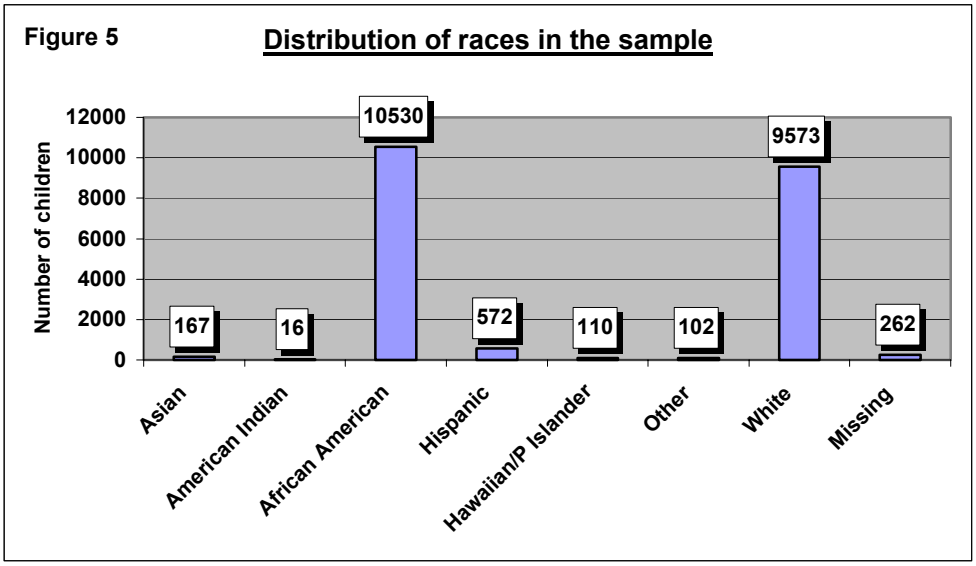
Urgent Dental care: Pain, swelling, infection, and soft tissue ulceration of more than two weeks duration (Next dental visit should be within 24 hours).

Early Dental care: Caries without accompanying signs or symptoms, individuals with spontaneous bleeding gums, suspicious white or red soft tissue areas (Next dental visit should be within several months).

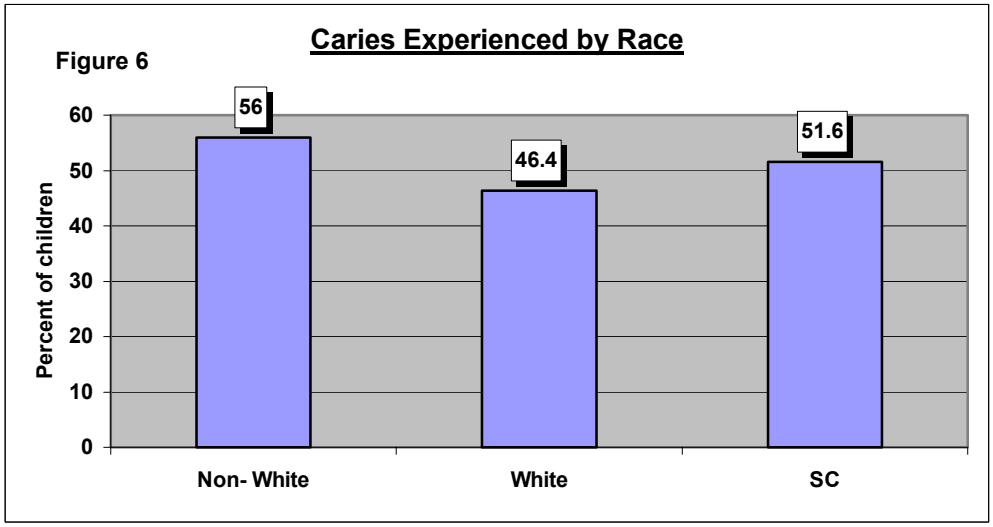
No obvious problem: Any patient without the above mentioned problems (Next dental visit should be next regularly scheduled check up).

ANALYSIS – BY RACE AND ETHNICITY

Distribution of races in the sample

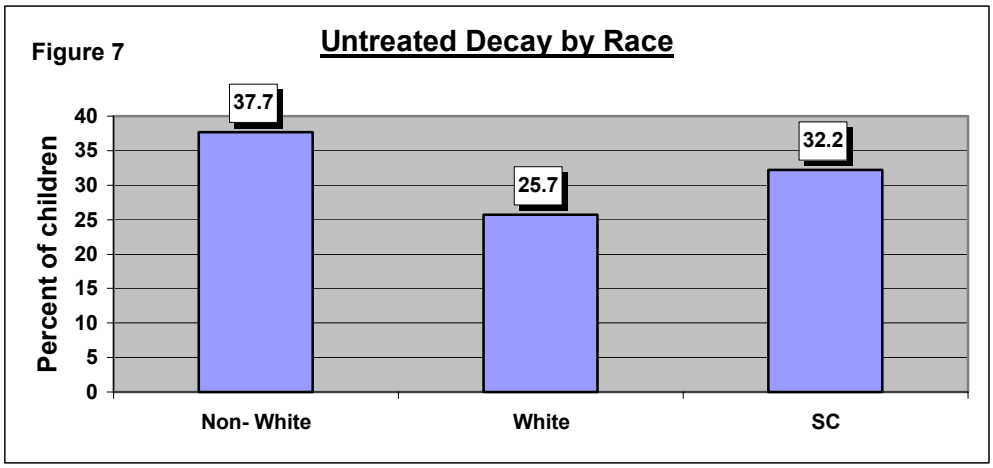


KEY FINDING # 5: Non-white children had a significantly higher ($p<0.05$) history of caries (56%) than did white children (46.4%).



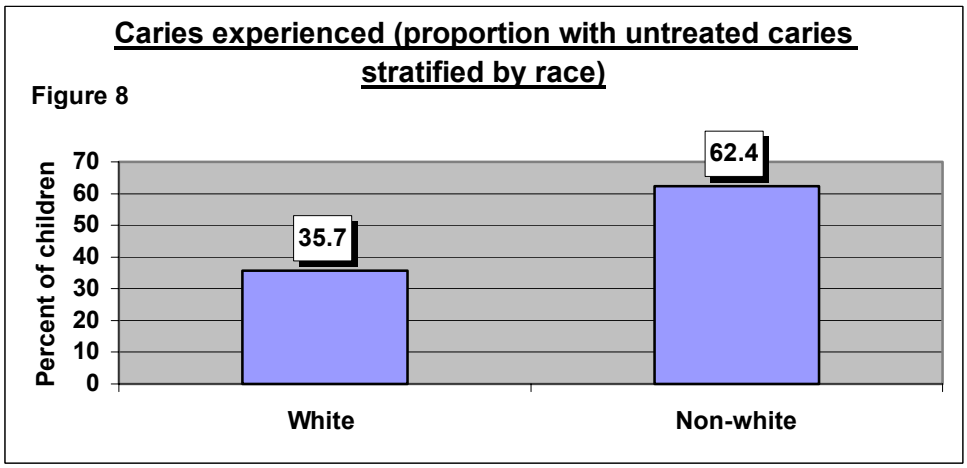
KEY FINDING # 6: 37.7% of non-white children had untreated decay while only 25.7% of white children had untreated decay. Overall, white children experienced significantly less untreated caries ($p<0.05$) compared to non-white children.

Figure 7



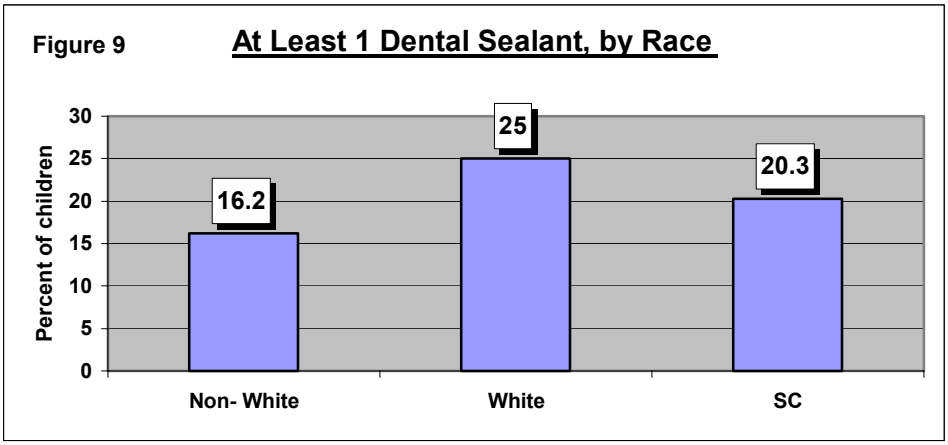
KEY FINDING # 7: Of those with caries experience Non-white children had significantly higher proportion of untreated caries (62.4%), as compared to white children (35.7%).

Figure 8



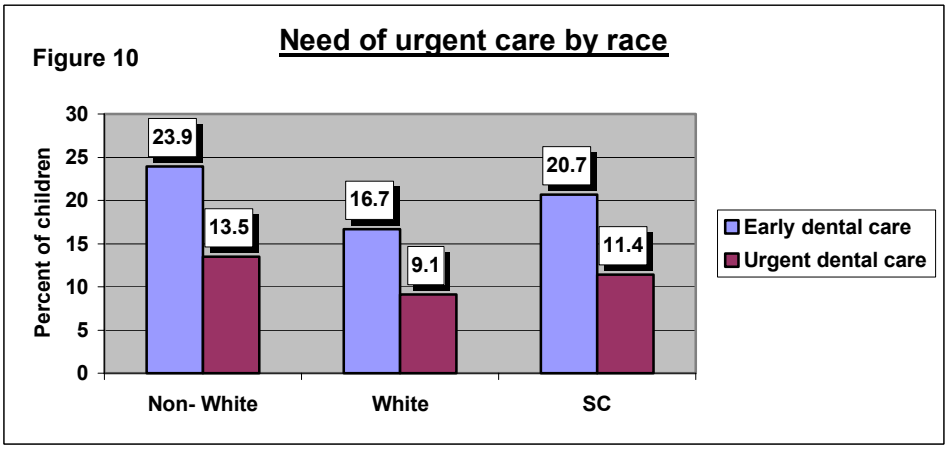
KEY FINDING # 8: White children had a statistically significant chance ($p<0.05$) of having at least one dental sealant compared to Non-White children.

Figure 9



KEY FINDING # 9: The need for early or urgent dental care was significantly higher ($p<0.05$) in non-white children than in white children. (24% of non-white children required early dental care, while 13.5% required urgent dental care compared to 16.7% of white children required early dental care, and only 9.1% required urgent care).

Figure 10



KEY FINDING # 10: Caries experience, untreated caries or needs of urgent care of Hispanic children were significantly higher p<0.05) compared to results for white non-Hispanic children.

Figure 11 **Caries Experience by Ethnicity**

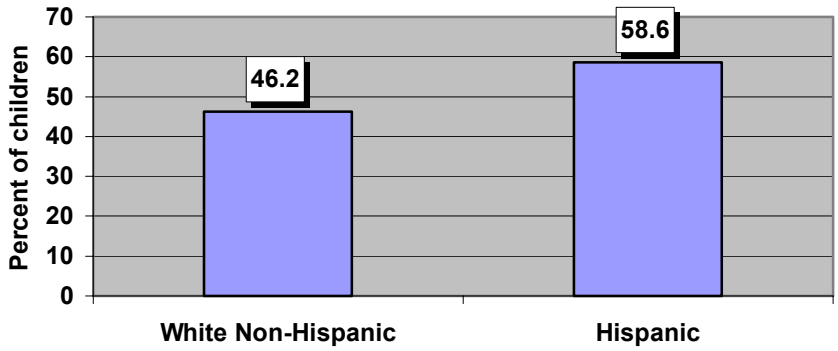


Figure 12 **Untreated Decay by Ethnicity**

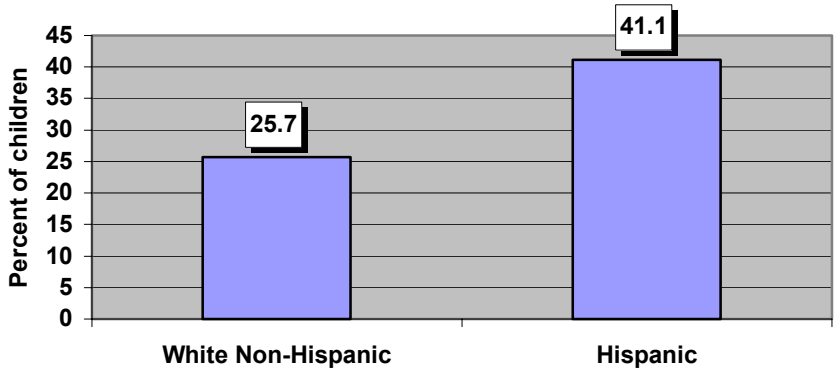
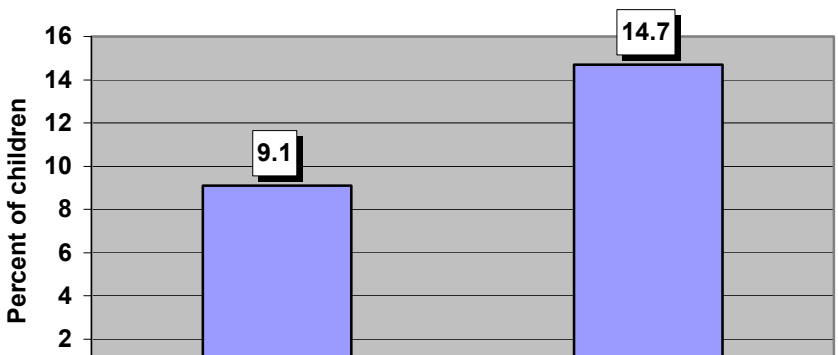


Figure 13 **Need for Urgent Treatment by Ethnicity**



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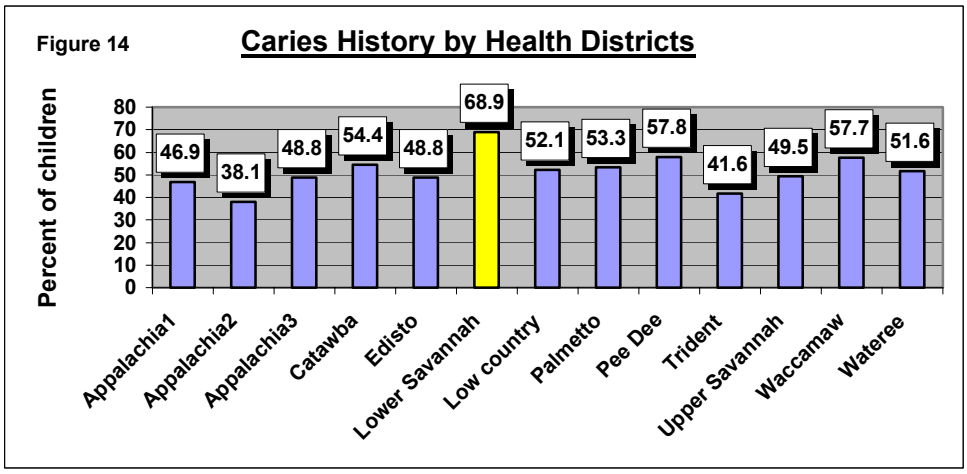
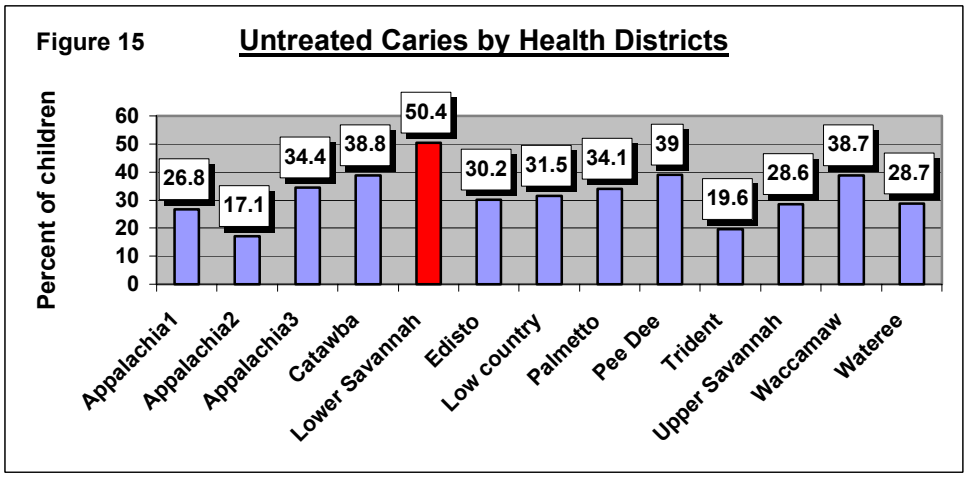
ANALYSIS – BY PUBLIC HEALTH DISTRICTS

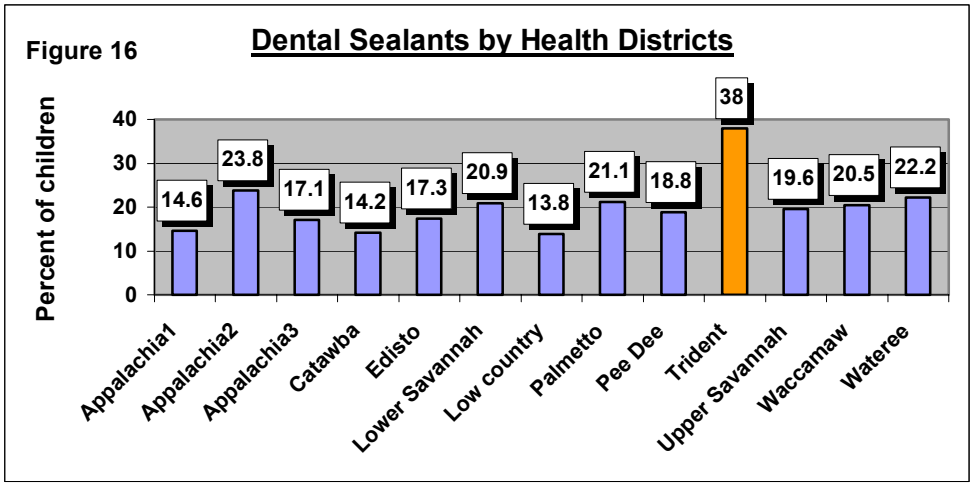
KEY FINDING # 11: The Lower Savannah Public Health District had a significantly higher proportion (68.9%) of children with caries history as compared to other Public Health Districts



KEY FINDING # 12: The Lower Savannah Public Health District also had a significantly higher proportion of children (50.4%) with untreated caries as compared to other Public Health Districts.



KEY FINDING # 13: The Trident Public Health District had the highest proportion (38%) of children with at least one dental sealant. This is significantly higher than any other Public Health District.



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Key Findings - By Socioeconomic Status

Information on the proportion of students in each school surveyed who were eligible for free and/or reduced meal program was obtained from South Carolina's Office of Research and Statistics. The schools were then stratified into the following two income categories:

- Higher Income School: Less than 50% of the students are eligible for free and/or reduced meals
- Lower Income School: More than 50% of the students are eligible for free and/or reduced meals

KEY FINDING # 14: Children from lower income schools had higher caries history (54.5%) than children who attended higher income schools (47.2%).

Figure 17 Caries History by Socioeconomic Status

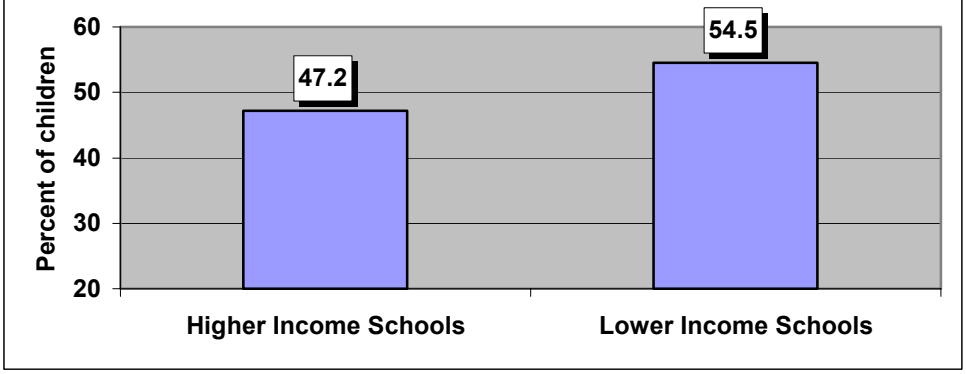
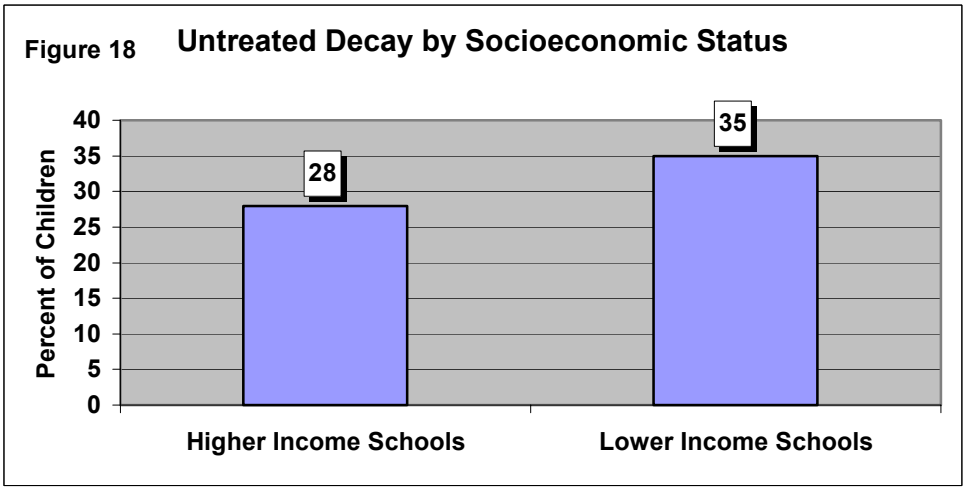


Figure 18 Untreated Decay by Socioeconomic Status



Similarly, lower income schools had a higher proportion of children with untreated decay (35%) than did higher income schools (28%).

KEY FINDING # 15: Children who attended lower income schools were less likely to have at least one dental sealant than children who attended higher income schools.

Figure 19

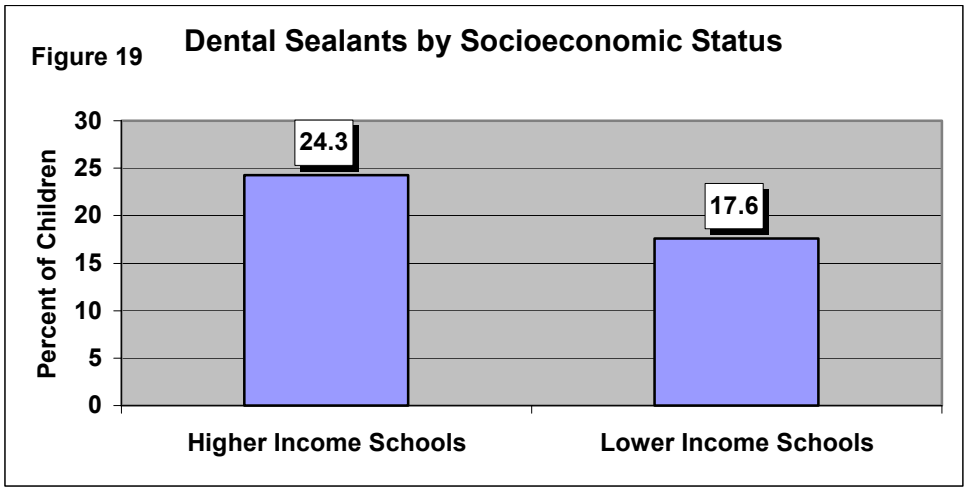
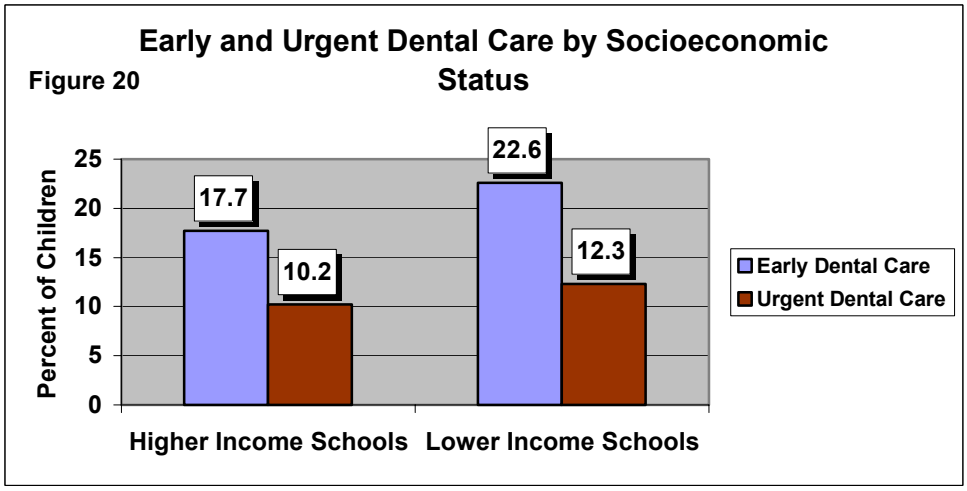


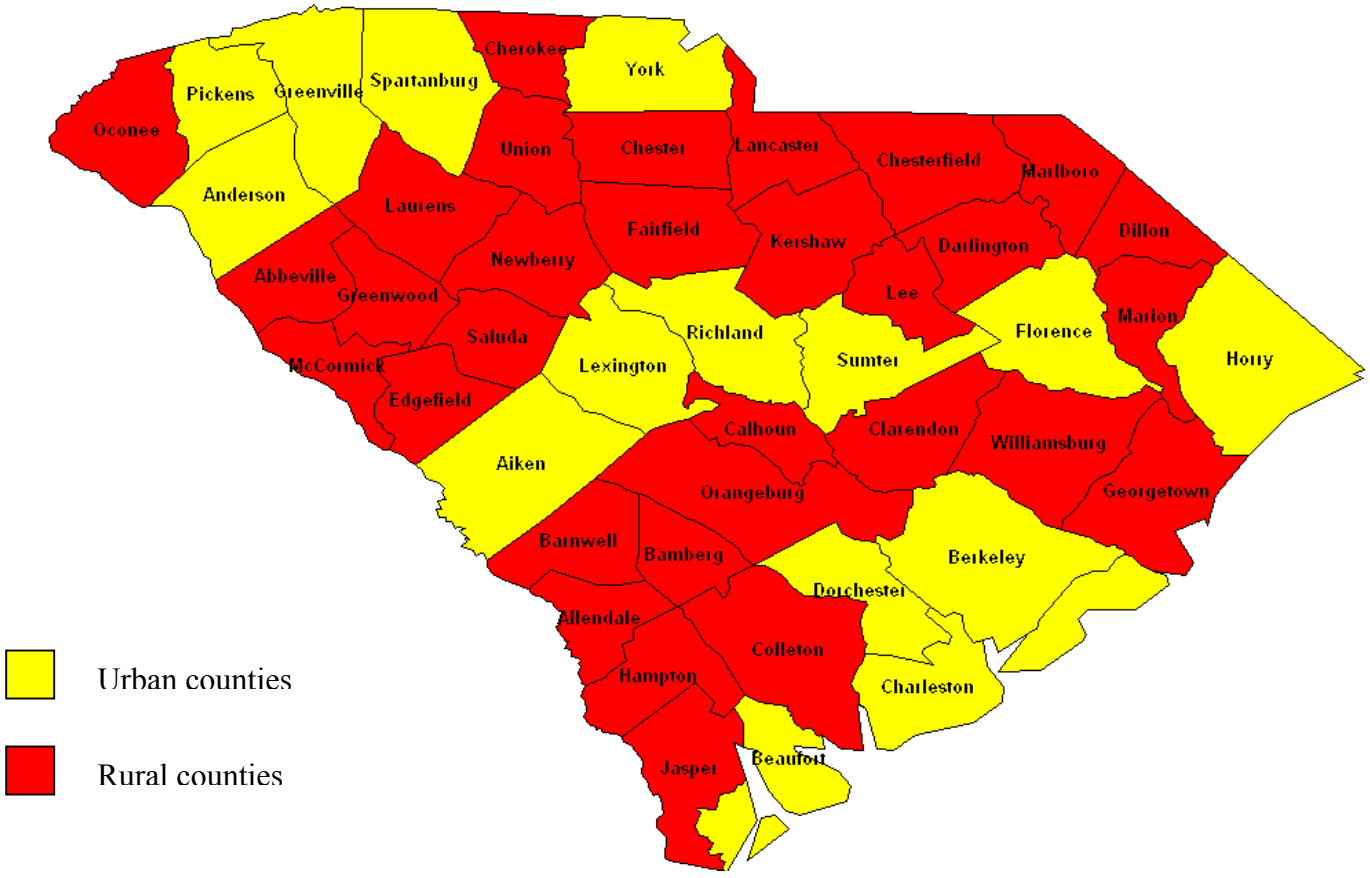
Figure 20



Lower income school children had a higher need for both early and urgent dental care as compared to children in higher income schools.

SOUTH CAROLINA ORAL HEALTH NEEDS ASSESSMENT 2002

Work force analysis (Dentists, Dental Hygienists) - Rural vs. Urban counties *



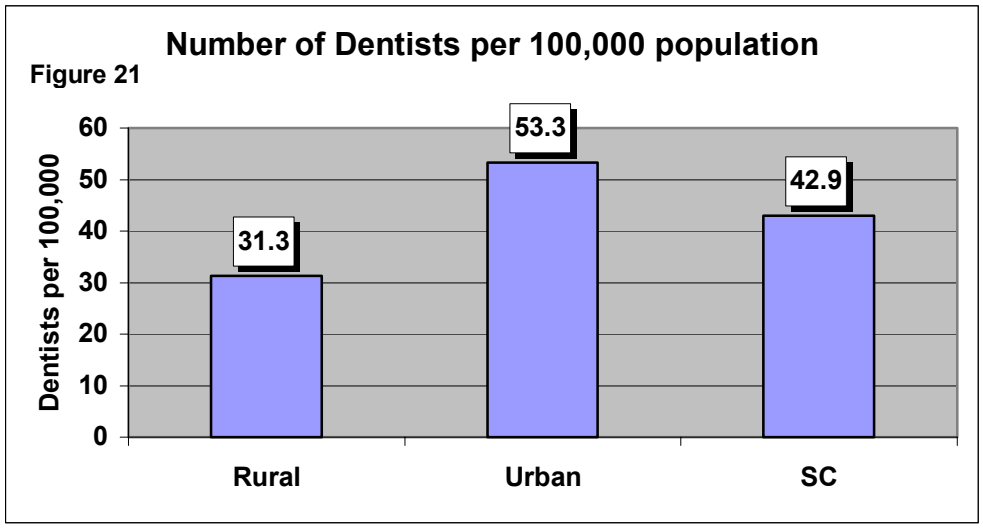
*Rural and urban counties definition is based on the size of the largest town. Counties with largest town 25,000 or greater are called ***Urban***, and counties with largest town less than 25,000 are called ***Rural*** (South Carolina State Office of Rural Health)

Dentists

KEY FINDING # 16: According to the Office of Research and Statistics (ORS) at the SC Budget and Control Board, there are only 1,722* dentists employed in South Carolina (46 counties). Of these only 364 dentists are employed in 31 rural counties. In comparison 15 urban counties have 1520 practicing dentists (see table below). This difference is statistically significant.

	Number of dentists	Total Population
South Carolina	1,722*	4,012,012
Rural counties (31)	364	1,161,245
Urban counties (15)	1520	2,850,767

Key Finding #17: Urban counties have 53.3 dentists per 100,000 people. In comparison rural counties have only 31.3 dentists per 100,000 people.



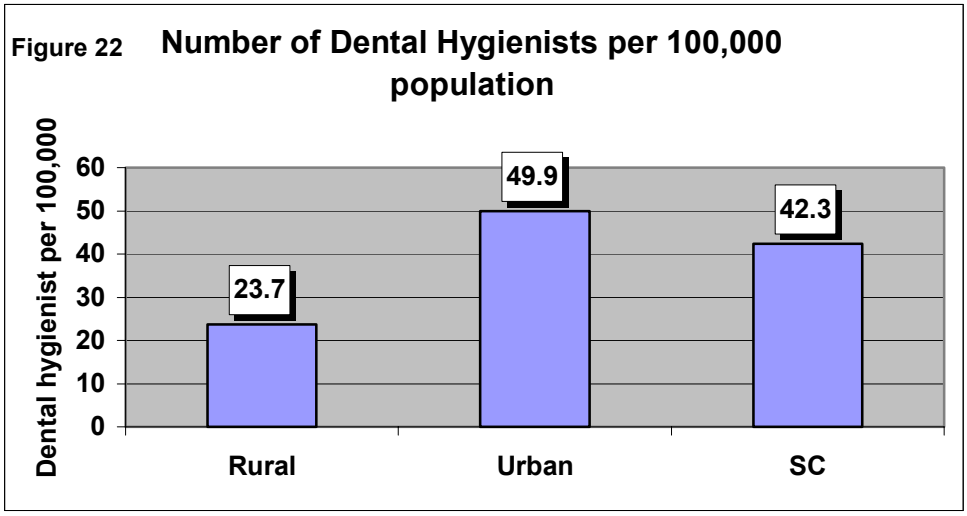
*Each dentist is included in his/her primary practice as well as in any county in which he/she has a secondary practice location. Each dentist is counted only once in the state total. Thus the numbers by county may not add to the state total.

Dental Hygienists

KEY FINDING # 17: According to ORS, there are only 1,698 dental hygienists employed in South Carolina (46 counties). Of these only 275 dental hygienists are employed in 31 rural counties. In comparison 15 urban counties have 1423 practicing dental hygienists (see table below). This difference is statistically significant.

	Number of dental hygienists	Total Population
South Carolina	1,698	4,012,012
Rural counties (31)	275	1,161,245
Urban counties (15)	1423	2,850,767

Key Finding #18: Urban counties have 49.9 dental hygienists per 100,000 people. In comparison rural counties have only 23.7 dental hygienists per 100,000 people.



An Overview of South Carolina Oral Health Surveillance System

South Carolina's oral health surveillance system will be an extension of the needs assessment process. However, in addition to the clinical variables examined during the needs assessment process, several other oral health events will be incorporated into the surveillance system. These will include data from the CDC WFRS (Water Fluoridation Reporting System), the National Oral Health Surveillance System (NOHSS), the South Carolina Central Cancer Registry, the Behavior Risk Factor Surveillance System (BRFSS), the Youth Risk Behavior Surveillance (YRBS), the Pregnancy Risk Assessment Monitoring System (PRAMS), and from Medicaid (obtained through the ORS, SC Budget and Control Board).

The surveillance system will monitor the oral health status for all age groups (early childhood population, school-aged population, young adults, adults, and the elderly). At present, we are capable of acquiring data for school-aged children through partnerships with school program providers, and early childhood screening data through Head Start and the First Steps programs. The enormity of such a task will require considerable planning and resources before the State has the capacity to monitor the oral health status of all the age groups.

Data produced from the surveillance system will be effectively disseminated to the Centers for Disease Control and stakeholders in the state in the form of written reports, electronic news letters, presentations, and the DHEC oral health website.

APPENDIX A

Definitions of races*

- **White —** A person having origins in any of the original peoples of Europe, the Middle East, or North Africa. It includes people who indicate their race as "White" or report entries such as Irish, German, Italian, Lebanese, Near Easterner, Arab, or Polish.

- **Black or African American —** A person having origins in any of the black racial groups of Africa. It includes people who indicate their race as "Black, African Am., or Negro," or provide written entries such as African American, Afro American, Kenyan, Nigerian, or Haitian.

- **American Indian and Alaska Native —** A person having origins in any of the original peoples of North and South America (including Central America), and who maintain tribal affiliation or community attachment. It includes people who classify themselves as described below.
  American Indian — Includes people who indicate their race as "American Indian," entered the name of an Indian tribe, or report such entries as Canadian Indian, French-American Indian, or Spanish-American Indian.
  Alaska Native — Includes written responses of Eskimos, Aleuts, and Alaska Indians as well as entries such as Arctic Slope, Inupiat, Yupik, Alutiiq, Egegik, and Pribilovian. The Alaska tribes are the Alaskan Athabaskan, Tlingit, and Haida. The information for Census 2000 is derived from the American Indian Detailed Tribal Classification List for the 1990 census and was expanded to list the individual Alaska Native Villages when provided as a written response for race.

- **Asian —** A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam. It includes "Asian Indian," "Chinese," "Filipino," "Korean," "Japanese," "Vietnamese," and "Other Asian."
  Asian Indian — Includes people who indicate their race as "Asian Indian" or identify themselves as Bengalese, Bharat, Dravidian, East Indian, or Goanese.
  Chinese — Includes people who indicate their race as "Chinese" or who identify themselves as Cantonese, or Chinese American. In some census tabulations, written entries of Taiwanese are included with Chinese while in others they are shown separately.
  Filipino **—** Includes people who indicate their race as "Filipino" or who report entries such as Philipino, Philippine, or Filipino American.
  Japanese **—** Includes people who indicate their race as "Japanese" or who report entries such as Nipponese or Japanese American.
  Korean **—** Includes people who indicate their race as "Korean" or who provide a response of Korean American.
  Vietnamese **—** Includes people who indicate their race as "Vietnamese" or who provide a response of Vietnamese American.
  Cambodian — Includes people who provide a response such as Cambodian or Cambodia.
  Hmong **—** Includes people who provide a response such as Hmong, Laohmong, or Mong.
  Laotian **—** Includes people who provide a response such as Laotian, Laos, or Lao.
  Thai — Includes people who provide a response such as Thai, Thailand, or Siamese.
  Other Asian — Includes people who provide a response of Bangladeshi, Burmese, Indonesian, Pakistani, or Sri Lankan.

- **Native Hawaiian and Other Pacific Islander —** A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands. It includes people who indicate their race as "Native Hawaiian," "Guamanian or Chamorro," "Samoan," and "Other Pacific Islander."
  Native Hawaiian — Includes people who indicate their race as "Native Hawaiian" or who identify themselves as "Part Hawaiian" or "Hawaiian."
  Guamanian or Chamorro — Includes people who indicate their race as such, including written entries of Chamorro or Guam.
  Samoan **—** Includes people who indicate their race as "Samoan" or who identified themselves as American Samoan or Western Samoan.
  Other Pacific Islander **—** Includes people who provided a write-in response of a Pacific Islander group such as Tahitian, Northern Mariana Islander, Palauan, Fijian, or a cultural group such as Melanesian, Micronesian, or Polynesian.

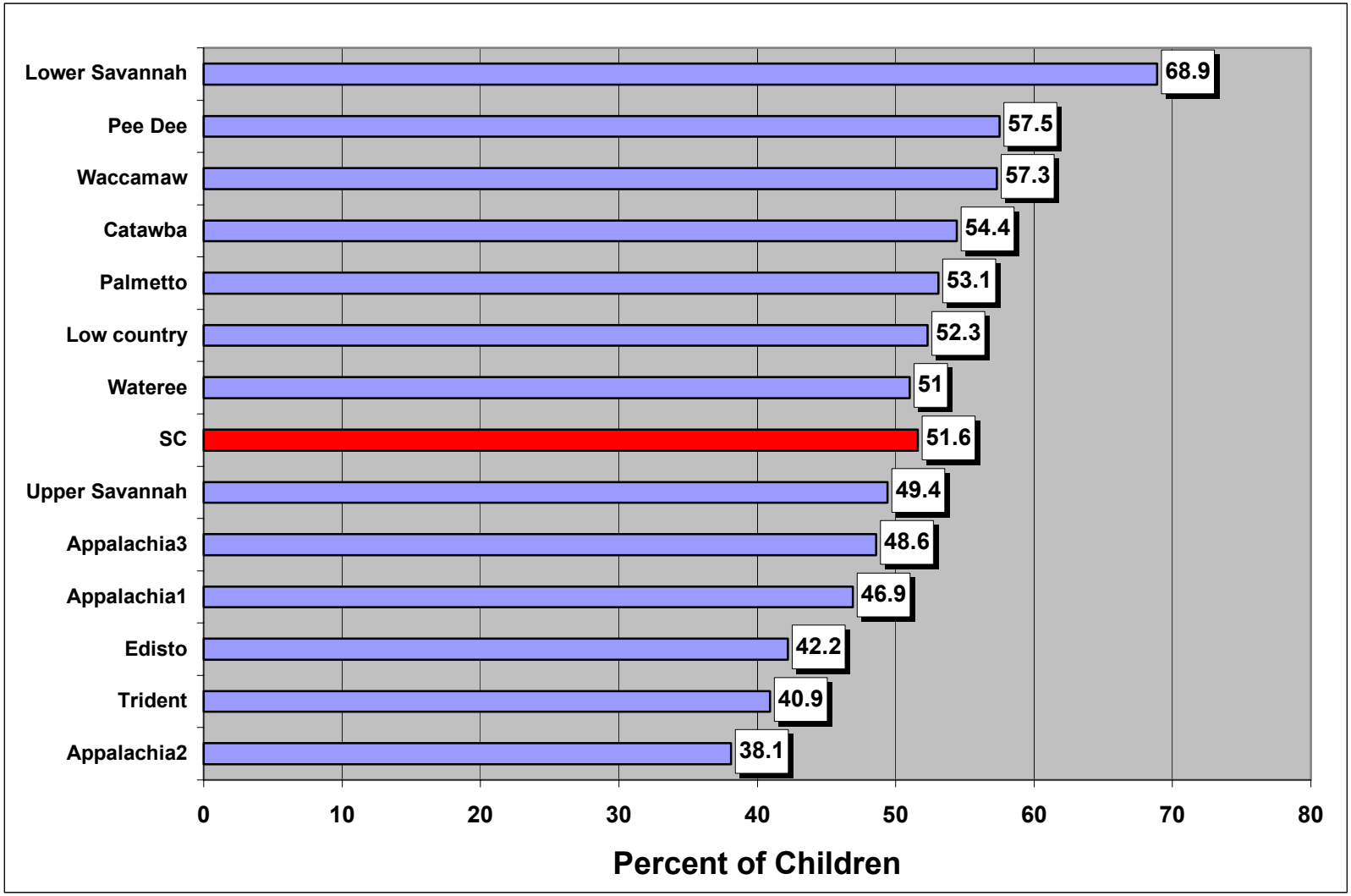
- **Hispanic or Latino —** People who identify with the terms "Hispanic" or "Latino" are those who classify themselves in one of the specific Hispanic or Latino categories listed on the questionnaire—"Mexican," "Puerto

Rican," or "Cuban"—as well as those who indicate that they are "other Spanish, Hispanic, or Latino." Origin can be viewed as the heritage, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States. People who identify their origin as Spanish, Hispanic, or Latino may be of any race.

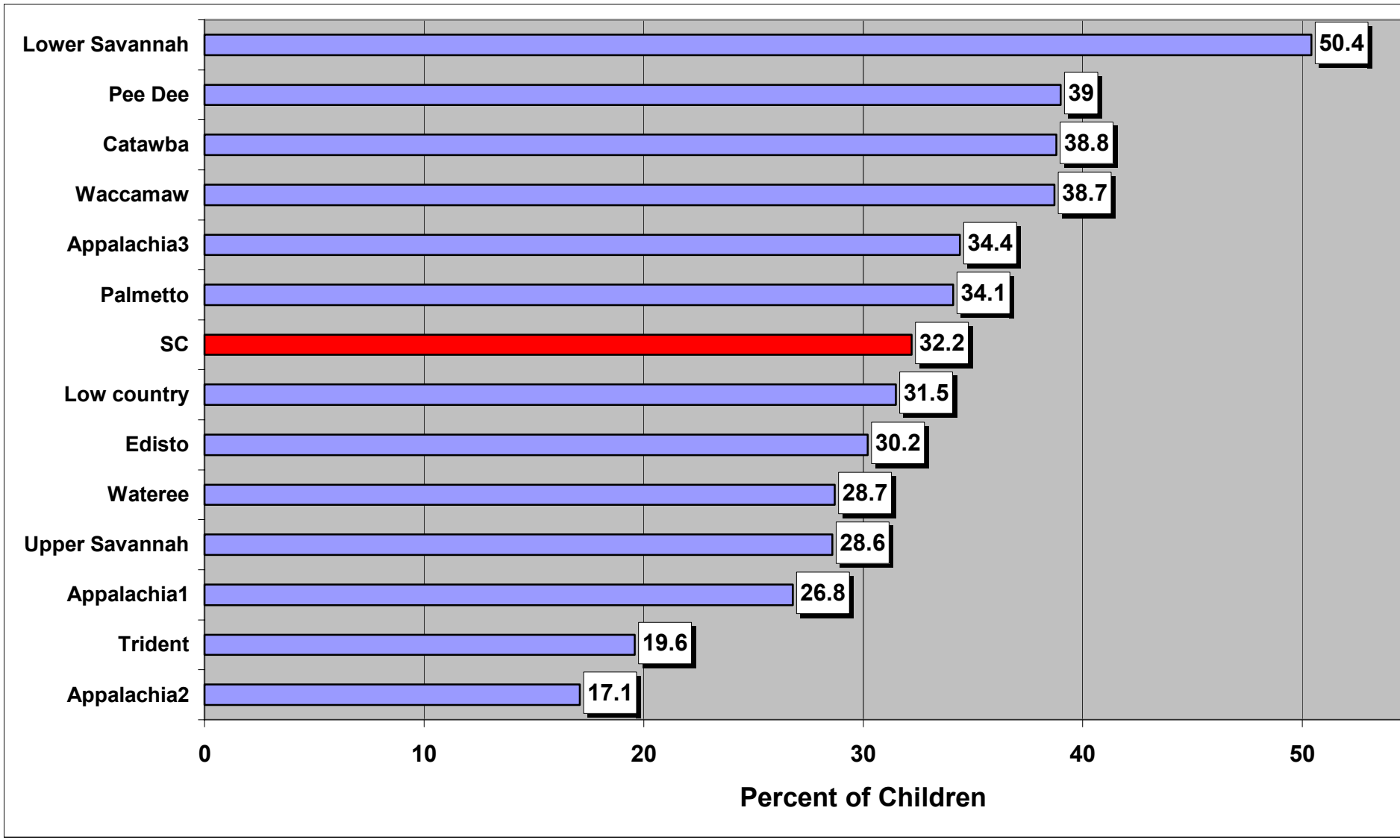
* ***US CENSUS BUREAU***

APPENDIX B

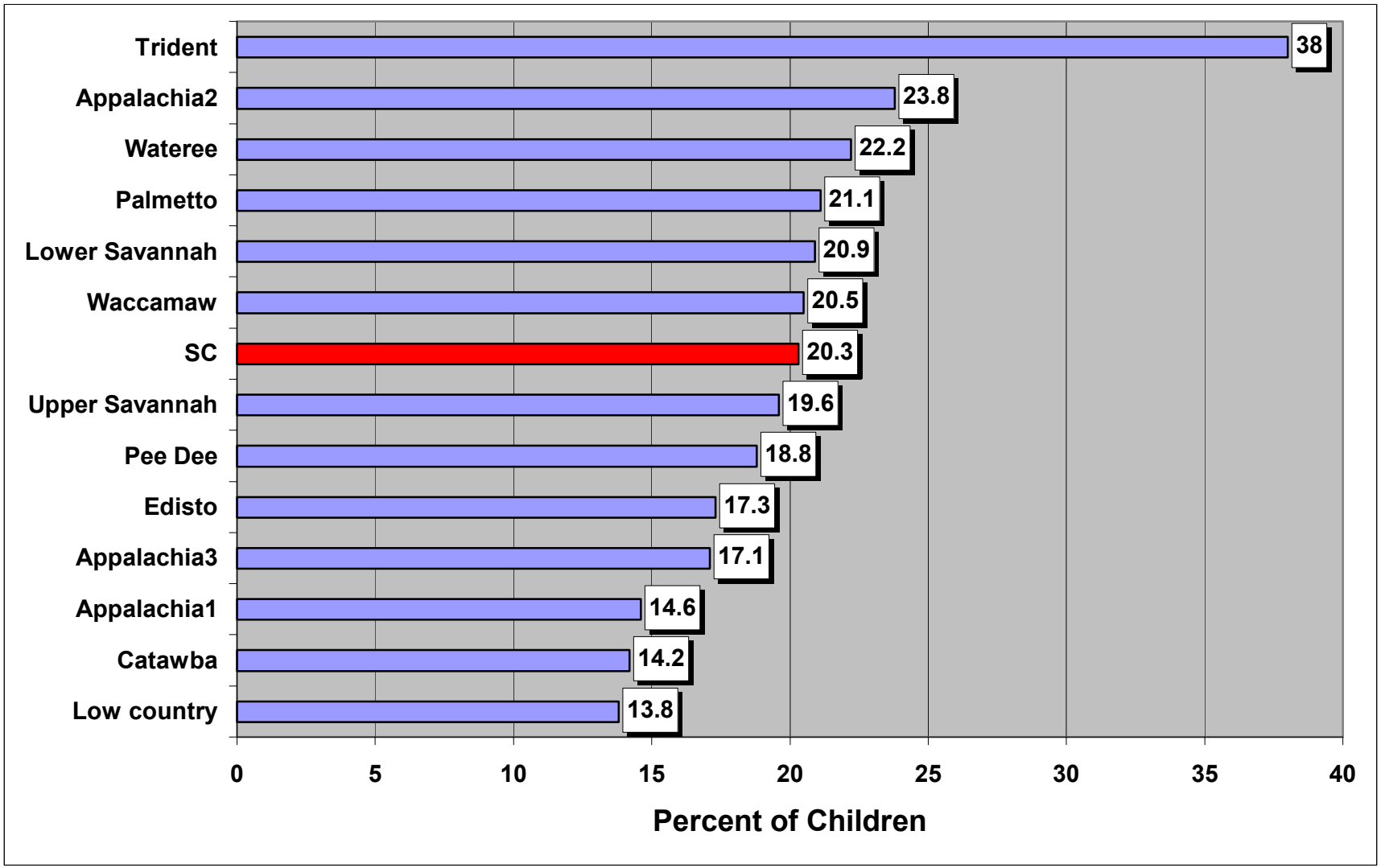
RANK ORDER OF PUBLIC HEALTH DISTRICTS BY CARIES EXPERIENCED



RANK ORDER OF PUBLIC HEALTH DISTRICTS BY UNTREATED CARIES



RANK ORDER OF PUBLIC HEALTH DISTRICTS BY PRESENCE OF DENTAL SEALANT ON AT LEAST 1 MOLAR



Appendix C

Demographics of South Carolina

General Facts

- South Carolina is predominantly a rural state.
- Total population – 4,012,012
- Total counties – 46 (31 Rural counties, 15 urban counties)
- Density per square miles – 133.2 people per square mile
  - Greenville county – most populated 479.2 people per square mile
  - Allendale county least populated 27.5 people per square mile
- Median family income - $44,227 (38th nationally)
- Median Household income - $37,082
- Per capita income - $ 18,795
- 25.2% of the population is under 18 years of age
- Total population in South Carolina Public Schools for year 2002 (K-12) – 669,701 students
- Total population in South Carolina Public Schools for year 2002 (K & 3) was 101,154 students – This is the sampling frame for the Needs Assessment project.

Race and Ethnicity

White	67.2%
Black or African American	29.5%
American Indian and Alaska Native	0.3%
Asian	0.9%
Native Hawaiian and Other Pacific Islander	<0.1%
Hispanic or Latino (of any race)	2.4%

Children (Facts and figures)

- Total number of children under age 18 in the state – 1,009,641 (59.2% White, 40.8% African American and others)

- **Poverty -** Children Under Poverty in 1999 (see table below)

Percent of Poverty	Total	
	#	%
Under 50%	89,538	9%
Under 100%	**187,275**	**18.8%**
Under 125%	245,464	24.7%
Under 150%	308,538	31%
Under 175%	368,490	37.1%
Under 185%	393,255	39.5%
Under 200%	**426,484**	**42.9%**
Total Children	1,009,641	

- **Inadequate Health Care**

  - State average rate of children and youth under age 18 without health insurance in families with income under 200% of poverty in South Carolina was 16.6% and 9.9% above 200% of poverty. If the above rates are applied to the schools there are 70,893 children in the state below 200% of poverty with no health insurance, and 57,871 children above 200% poverty with no health insurance, for a total of 128,764 uninsured children in South Carolina.
  - According to the 2000 Surgeon General's Report there are 2.6 children without dental insurance for every child without health insurance. The estimate for SC is 334,786 children without dental insurance.
  - The number lacking primary care is at least double the number lacking insurance.
  - The children lacking primary care are often dependent on health services at school.
  - There are currently 539.2 nurses working in the schools. In order to meet the nationally recommended student to nurses of 750:1, we should have 870 nurses working in the school system.

Medicaid

- Of the 682,744 children in South Carolina public schools (year 2002-03), 55.8% of children were Medicaid and free and reduced lunch program eligible.

- In June 2001, the total number of South Carolina children, birth through 18, enrolled in Medicaid was 423,146. The total can be broken into the following age and race groupings:

	White	African American	Hispanic	Other	Total
Children Under 1	13,657	16538	1,340	1,596	33,131
Children 1 - 5	47,310	68,320	2,869	5,854	124,353
Children 6 - 14	66260	120,336	2,122	8,225	196,943
Children 15 - 18	23,605	43,100	475	1,539	68,719
Total	150,832	248,294	6,806	17,214	423,146

- The total Medicaid expenditure in South Carolina for health services provided to children ages 0 to 18 for the state fiscal year 2002 were $991 million, at an average statewide of $2,343 per child enrolled.

References

1) *South Carolina Office of Research and Statistics*
2) *US Census Bureau*
3) *South Carolina Statistical Abstract 2001-02*
4) *South Carolina Kids count 2003*